Commonwealth of Kentucky
Division for Air Quality

DRAFT PERMIT STATEMENT OF BASIS

DRAFT TITLE V PERMIT NO. V-03-031 R2
GALLATIN STEEL CO.
WARSAW, KY
JULY 23, 2007
HOSSEIN RAKHSHAN, REVIEWER
AI/AFS#: 1449/021-077-00018
ACTION/LOG#: APE20070002

SOURCE DESCRIPTION:

The Gallatin Steel facility in Ghent**,** Kentucky recycles scrap steel to make new hot-rolled steel coils using a continuous Compact Strip Production or CSP process. Gallatin is ISO/TS 16949 certified. The manufacturing facility consists of a twin-shell DC electric arc furnace, a ladle metallurgy facility, a thin-slab continuous caster and a six-stand hot finishing mill. Gallatin Steel, located on the Ohio River in Ghent, KY, produces hot rolled sheet steel coil, hot rolled P&O coil and hot rolled slit coil in low carbon (C1010), medium carbon (C1015-C1035), high carbon (C1050-C1055) and HSLA chemistries (up to 80 ksi min yield) from gauges of 0.055" to .625" thick and 42" to 64" wide.

CHANGE(S) TO PERMIT (REVISION 2):

Gallatin Steel Company, an existing PSD/Title V major source, submitted a permit modification application to its existing V-03-031 R1 permit. The plant is a PSD/Title V source because criteria air pollutants potential emissions exceed the major source thresholds.
Gallatin Steel Company is proposing to modify and increase its production rates to a maximum of 275 tons per year with this application. The facility proposes to add a twin-shell Ladle Metallurgy Furnace (LMF) to replace the existing LMF. The new unit will be relocated to optimize the flow of product through the melt shop. Also, the capacity of the two EAF transformers will be upgraded to 90 Mega-Volt-Ampere (MVA) from the existing 75 MVA transformers. This application is considered a significant revision that is subject to the provisions of PSD regulation 401 KAR 51:017.

Gallatin submitted the PSD application on May 9, 2007. This permit is being issued as a permit modification.
The Division incorporated the following changes to Section B of the permit:

a) The total baghouse particulate shall not exceed 32.1 lbs/hr (BACT) instead of 16.05 lb/hr.
b) The total baghouse carbon monoxide emission shall not exceed 550 lbs CO/hr (BACT) instead of 400 lb/hr.
c) The total baghouse nitrogen oxide emissions shall not exceed 140.25 lbs NO2/hr (BACT) instead of 102 lb/hr.
d) The total baghouse VOC emissions shall not exceed 35.8 lbs VOC/hr (BACT) instead of 26 lb/hr.
e) Total lead baghouse emissions shall not exceed 0.22 lb Pb/hr (BACT) instead of 0.162 lb/hr.

f) Total SO_2 emissions shall not exceed 55 lb/hr (BACT) for products greater than or equal to 0.012 wt % of S and for all other products 134.8 lb/hr (BACT) instead of 40 lb/hr and 98 lb/hr respectively.

g) Following corrections are made per source request:
   1. One of the LMF (from 0E1 & 0E2) and Slab Heat Tunnel Furnace (0R2) have been removed from the existing permit since they were never constructed.

h) Section H, Alternate Operation Scenarios does not apply to Gallatin Steel and has been removed from the permit. Instead, Steel production rates shall not exceed 275 tons per hour (combined production rate, averaged over 168 hours) from the twin shell EAF as measured at the outlet of the caster. Simultaneous arc operation in both shells is prohibited (limit on PTE). These limitations have been added to Operation Limitation for EP1 and EP2.

The increase in annual emissions due to modification is 211.4 tpy of SO_2; 84.3tpy of TSP; 84.3 tpy of PM10; 220.0 tpy of NOx; 862.8 tpy of CO; 56.1 tpy of VOC, and 0.35 tpy of Pb. Since the mill is located in an attainment area for all criteria pollutants, pollutants that are emitted in excess of the PSD significant emission rate are subject to PSD review. Due to this modification, all criteria pollutants except lead will be emitted in excess of the PSD significant emission rate. The PSD requirements include demonstration of Best Available Control Technology (BACT) and an ambient air quality impact analysis to address compliance with the PSD increments and NAAQS.

BACT EVALUATION:

BACT analyses were performed for each emissions unit of the proposed modification. The twin shell EAF utilizes a fourth –hole evacuation system and a downstream baghouses to minimize particulate emissions. The baghouses also control emissions from the LMF and the Caster. The proposed emission limits to keep the pollutants below the corresponding PSD Class II increments are described below:

BACT Analysis for EAF:

Proposal for NOx - For the existing EAF, BACT for controlling NOx emissions is proposed as the use of existing natural gas-fired oxyfuel burners to meet a NOx emission of 0.51 lb/ton of steel produced.

Proposal for CO -The existing EAF is equipped with a Direct Evacuation Control (DEC) ducts for mitigation of CO emissions. BACT for controlling CO emissions from the existing EAF is proposed as the use of the DEC ducts to meet a CO emission rate of 2.0 lbs/ton of steel produced.

Proposal for SO_2- BACT for controlling SO2 emissions from the EAF is the use of a scrap management program to meet the dual emission limit as follow:
For product greater than or equal to 0.012 wt % S a limit of 0.2 lb/ton of liquid steel applies and for all other products the limit is 0.49 lb/ton of liquid steel.
Proposal for VOC - BACT for controlling VOC emissions from the EAF is proposed as the utilization of a scrap management program to meet the existing VOC emission rate of 0.13 lb/ton of liquid steel.

Proposal for PM/PM10 - BACT for controlling TSP/PM_{10} emissions from the EAF is proposed

as the use of fabric filtration to meet a filterable TSP/PM_{10} emission rate of 0.0018 gr/dscf.

BACT Analysis for Ladle Metallurgy Furnace (LMF):

Gallatin is proposing to replace the existing LMF with a new LMF. The new LMF will be located on the east side of the Melt Shop. The LMF is considered as the buffer between the melting furnace and the Caster. Molten metal is tapped into ladle and transported either by electric overhead traveling cranes or by a rail car system to the LMF. Additional alloying material may be added to meet the required product specifications. After the alloy addition, the molten metal is mixed and reheated in the ladle by electrodes. Fumes from the LMF are evacuated to the Melt Shop baghouse, considered as BACT for PM emissions. Small amount of fugitives may be emitted from the Melt Shop building. The existing roof canopy system has a high capture efficiency of the dust generated inside the Melt Shop building. The BACT emission limit for the EAF apply to the LMF since the EAF limits represent the entire Melt Shop emissions.

BACT Analysis for Caster:

The Caster forms a solid continuous slab as molten steel passes through a water-cooled mold. Fugitives PM emissions may be generated during the casting of hot metal; however, the emissions are evacuated to the Melt Shop baghouse, considered as BACT for PM emissions. The BACT emission limits for the EAF apply to the Caster since the EAF limits represent the entire Melt Shop emissions.

Below is a summary of the BACT limits and control equipment:

Pollutant	Control Description	BACT Limit
NOx	Combustion control	0.51 lb/ton
CO	Use of existing DEC ducts	2.0 lb/ton
VOC	Scrap management program	0.13 lb/ton
SO2	Scrap management program	0.2-0.49 lb/ton
PM(PM10)	Baghouse	0.0018 gr/dscf

Modeling Methodology:

Model simulations for short –term and annual-average SO_2, CO, PM_{10}, and NO_2 concentrations were performed with the AERMOD dispersion mode using the 5-year meteorological database. AERMOD is an EPA-approved, steady state Gaussian plume model capable of modeling multiple sources in simple and complex terrain.

Modeling Results – Significant Impact Areas

The significant impact area is defined as the area in which predicted concentrations, due to the modification, exceed specified significant impact increments on a pollutant–specific basis. The results of the dispersion modeling analyses for the modification's emissions of each criteria pollutant are presented below:

Pollutant	Averaging Period	Maximum Predicted concentration ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)
PM_{10}	24-hour Highest	5.3	5
	Annual	1	1
NOx	Annual	1.3	1
CO	1-hour Highest	272.5	2000
	8-hour Highest	71.5	500
SO2	Annual	1.6	1
	24-hour Highest	11.2	5
	3-hour Highest	21.3	25

The amount of concentrations for PM10, NOx and SO2 are above the assigned Significant Impact level, thus, additional dispersion modeling analyses are required. The CO impacts are less than Significant Impact Level and therefore no further modeling was performed for CO.

PSD Class II Increment Assessment:

The PSD requirements provide for a system of area classifications that determine the amount of growth allowed before significant air quality deterioration is deemed to occur. Class I areas have the smallest increments and allow the least growth. The impacts of the proposed project on the nearest Class I areas will be discussed as below. The existing facility is located in a Class II area that allows moderate growth. The results of the modeled impacts on the Class II have been presented in the table below. The maximum predicted concentrations were contained in a portion of the receptor grid that had a 100-meter spacing:

Pollutant	Averaging Period	Maximum Predicted concentration ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)
PM_{10}	24-hour Second Highest	17.4	30
	Annual	3.5	17
NOx	Annual	5.3	25
SO2	Annual	12.7	20

Pollutant	Averaging Period	Maximum Predicted concentration ($\mu g/m^3$)	PSD Class II Increment ($\mu g/m^3$)
	24-hour Second Highest	74.7	91
	3-hour Second Highest	183.4	512

PSD CLASS I AREA ANALYSES:

The nearest PSD Class I area is Mammoth Cave National Park, located approxiametly 190 Km southeast from the Gallatin mill. Due to the magnitude of the emissions associated with the proposed modification, the Federal Land Manager did not require detailed ambient air quality impact analyses.

Comparison with National Ambient Air Quality Standards (NAAQS):

One of the PSD review requirements is to demonstrate compliance with the NAAQS for each pollutant for which the modifications has a significant impact:

Pollutant	Averaging Period	Maximum Predicted concentration ($\mu g/m^3$)	Primary NAAQS ($\mu g/m^3$)
PM_{10}	24-hour Second Highest	81.2	150
	Annual	31.9	50
NOx	Annual	27.2	100
SO2	Annual	18.6	80
	24-hour second Highest	116.7	365
	3-hour second Highest	395.6	1300

PSD Ambient Air Quality Monitoring Requirement:

With respect to the ambient air quality monitoring requirements of PSD review, representative air quality background concentrations were available; thus, one- year preconstruction monitoring program is not required. The maximum impact due to the modification in comparison with the monitoring deminimis is presented in table below:

Pollutant	Averaging Period	Maximum Predicted Concentration($\mu g/m^3$)	Monitoring Deminimis Concentration ($\mu g/m^3$)
NOx	Annual	1.3	14
CO	8-hour	71.5	575
SO2	24-hour	11.2	13
PM (PM_{10})	24-hour	5.3	10

It is noted that Gallatin Steel had performed ambient air quality monitoring at the site from 1994 to 1996. These data are considered as representative of background concentrations since there have been minor changes in the immediate vicinity of the mill. In addition to the Gallatin monitoring, other ambient monitors representatives of rural background are presented in the table below:

Pollutant	Monitor
NO2	North American Stainless- Ghent, KY
SO2	Jefferson County, Indiana Fort Thomas- Campbell county, KY
PM (PM10)	Fort Thomas- Campbell County, KY

Additional Impact Analyses:

a. **Construction and Growth Impact**- Since the mill is an existing source, Gallatin's construction changes will be minimal and anticipated growth in the area will also be minimal. Commercial growth is anticipated to occur at a gradual rate in the future. Each major source will be required to undergo PSD review; however, commercial growth will add to the background pollutant concentrations.

b. **Impact on Soil and Vegetation** – The maximum predicted ambient concentrations due to the existing sources and proposed modification at Gallatin Steel are below the ambient air quality standards and are not expected to have any significant impacts on soil and vegetation in the area.

c. **Impact on Visibility** – As part of the NSPS for Electric Arc Furnace, Gallatin is required to meet opacity limit. Opacity limits are also imposed on other sources at the mill. These limits reduce the events of visible plums, thus visibility impacts in the immediate vicinity of the mill should be negligible.

d. **Air Toxic Pollutant Impact** – There are trace amount of hazardous air pollutant (HAP) associated with the operation of the EAF.

DESCRIPTION OF CHANGES TO SECTION B (REVISION 1):

0E1/0E2 – Existing Melt Shop

1. The testing requirements listed under 3.e. were changed. The exhaust rate of SO_2 emissions was previously based on the combined flow through the caster canopy, EAF, 2 DEC and LMF ducts. After further review and based on comments received from the facility, SO_2

emissions are now based on the exhaust flow through the 2 DEC ducts.
2. The visible emission monitoring requirements under 4.c. have been changed to be consistent with the requirements in 4.b.
3. The reporting requirements under 6.b. were changed. Emission rates are to be reported as pounds per ton liquid steel produced as opposed to tons liquid steel tapped as was written in the draft permit.

0S1/0S2, 0B1/0B2 – Miscellaneous Dust

1. In the description of the emission point, all references to equipment constructed in August 1997 have been removed. The authority to construct this equipment expired during the issuance of the original Title V permit and no extension was granted.
2. The description of the control equipment was changed from "baghouse" to the more accurate "dust collector".
3. Control equipment operating conditions under 7.a., 7.d., 7.h. and 7.l were changed. The control equipment referenced by these conditions is more accurately a dust collector as opposed to a baghouse.

0EG – Generators

An error was found in the operating condition listed under 1.a. The maximum allowable diesel fuel sulfur content was changed from 5% to 0.5%.

DESCRIPTION OF CHANGES TO SECTION F:

The language under 12. describing temporary use of similar emission units while permitted unit are taken off line for maintenance has been removed.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 6 0, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.